NYCTALIS MIRABILIS (FUNGI: AGARICALES), A NEW SPECIES FROM AUSTRALIA

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ABSTRACT

May, Tom W. & Fuhrer, Bruce A. *Nyctalis mirabilis* (Fungi: Agaricales), a new species from Australia. **Muelleria 8(3): 385–390 (1995).** — *Nyctalis mirabilis* sp. nov. is described and illustrated from collections made in Victoria, where it is known only from Cool Temperate Rainforest, and Tasmania. This is the first record of *Nyctalis* from Australia.

INTRODUCTION

Species of *Nyctalis* Fr. are among the few agarics which grow on the basidiomes of other fungi, and the genus is further distinguished by the production of chlamydospores. *Asterophora* Ditmar: Fr. predates *Nyctalis* and in addition is sanctioned, but Donk (1962) does not consider the former genus to have priority because it represents the anamorphic state. Donk's interpretation is accepted here following, among others, Corner (1966) and Rauschert (1992), although Moser (1983) and Singer (1986) continue to use *Asterophora.*

All modern treatments include only two well documented and readily distinguishable species of *Nyctalis*: *N. agaricoides* (Fr.: Fr.) Bon & Courtec. [synonyms *Asterophora lycoperdoides* Fr.: Fr., *N. asterophora* Fr., *N. lycoperdoides* (Bull.) Konrad & Maubl.] and *N. parasitica* (Bull.: Fr.) Fr. Although often described under one of its synonyms, *N. agaricoides* is the name which must be employed because it is the sanctioned name based on the oldest basionym. Further species which have been described in the genus are likely to be abnormal states of other fungi (Corner, 1966; Singer, 1986).

In *N. agaricoides* the chlamydospores are stellate and are formed in the upper pileal trama, the pileus has a powdery surface and is globose to pulvinate, and the lamellae are often rudimentary, whilst in *N. parasitica* the chlamydospores are smooth and are formed in the lamellar trama and in the lower pileal trama, the pileus has a silky surface and is convex to umbonate, and the lamellae are blunt but comparatively normal (Thompson, 1936; Corner, 1966; Durand & Nicot, 1968; Moser, 1983; Phillips, 1983). Basidiomes of both species frequently do not produce basidiospores. The two species occupy a similar geographic range, both occurring in North America, Europe, North Africa, East Asia and Papua New Guinea (Corner, 1966; Horak, 1980; Singer, 1986), but the genus has not been recorded previously from Australia. The most common hosts are species of Russulaceae (*Lactarius* Pers. or *Russula* Pers.) Recent collections of *Nyctalis* from Victoria and Tasmania do not agree with either of the two known species.

MATERIALS AND METHODS

Colour notations in the form '6E5' are from Kornerup and Wanscher (1981), whilst those in the form '10YR 7/3' are from Munsell (1975; 1977). L is the number of lamellae, Q is the quotient of the length and width of an individual spore. Material for microscopic examination was mounted in 3% KOH. Spore measurements do not include the hilar appendage. The length of intercalary chlamydospores was measured from the septum with one subtending hypha to the septum with the other; the length of

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terminal chlamydospores was measured from the basal septum to the apex. Chlamydospore width does not include projections.

TAXONOMY

Nyctalis mirabilis T.W.May, *sp. nov.*

A *Nyctalis parasitica* chlamydosporis stellatis differt; a *N. agaricoide* supra pileum non pulverulentum, chlamydosporis praesentibus in trama lamellae et in trama pilei inferna differt.

HOLOTYPUS: Australia, Victoria, Eastern Highlands, Donna Buang Rd, Myrtle Creek, 37°42′S, 145°42′E, 10 Apr. 1986, *T.W. May B-281 & B.A. Fuhrer* (MEL 228691).

Pileus 13–27 mm diam., convex, broadly convex, plano-convex or campanulate, margin decurved then flaring out or curling up, sometimes broadly wavy; not hygrophanous, not translucent striate, or only with age at margin, surface dry, covered with a layer of fine silvery grey appressed fibrils over a brown ground colour (6E5) appearing silvery grey or pale greyish brown (10YR 7/3, 10YR 8/1, 5B2–3), occasionally with lilac flecks, darkening with age or handling to dark reddish brown (8–9F8). *Lamellae* normally formed, 1.5–4 mm deep, adnate with decurrent tooth, moderately crowded (L = 22–25), moderately thick, rarely forked, light brown (10 YR 5/4, 5D4–5) then dark brown or dark reddish brown (5YR 3/4, 7F8, 8–9F7), edge concolourous, even or wavy, not blunt, lamellulae present in several series. *Stipe* (8–)26–35 mm long, 1.5–3 mm diam., central, cylindrical or flattened above, even or a little expanded above, surface dry, concolourous with pileus, with silvery grey appressed longitudinal fibrils, coarser than those on the pileus and appearing silky striate, apex finely squamulose, basal mycelium pale grey, finely strigose, with pale grey cobwebby or felty mycelial mat on host surface. *Context* hollow in the stipe, sometimes with cavity extending into the pileus; very dark brown or dark reddish brown (2.5 YR 3/3) in the stipe and in the pileus over the lamellae, paler grey in the pileus beneath the surface and in the stipe immediately below surface. *Odour* strongly farinaceous to unpleasant. *Hymenium* extending over entire surface of lamellae. *Basidiospores* very sparse to common, 5–6(–7.5) × 3–4(–5) µm, Q = 1.25–1.67(–1.80), ellipsoid, smooth, thin-walled, not amyloid. *Basidia* 19–23 × 5–7 µm, clavate, 4-spored, sterigmata up to 4 µm long. *Chlamydospores* numerous in the lamellar trama and in the pileal trama above the lamellae, very sparse to absent in the upper part of the pileal trama and on the pileus surface, numerous in the host tissue, intercalary or terminal, fusoid-stellate, 13–35(–40) × 6–12.5(–15) µm, hyaline then pale yellow, outer wall up to 0.5 µm thick; initially with granular contents throughout, at length with an inner wall up to 0.5(–2.5) µm thick which excludes the projections and a segment adjacent to each subtending hypha (the apical portion of terminal chlamydospores is similarly excluded), enclosing contents which are granular and with small and large, refractive droplets, these contents eventually surrounded by a layer of laminated appearance, up to 3 µm thick; projections 6–11, bluntly conical, up to 6 µm long and 5 µm wide, apex sometimes truncate or expanded, when delimited by inner wall empty and sometimes with one or more septae; in terminal chlamydospores the apical portion is empty and up to 10 µm long. *Pileipellis* a cutis, consisting of parallel, cylindrical hyphae, 5–11 µm diam., radially arranged, becoming irregular over the centre. *Pileal trama* consisting of more or less parallel, cylindrical to broadly subfusoid hyphae, 5–17 µm diam., radially arranged, a little interwoven, becoming shorter and disorganised over the stipe. *Lamellar trama* regular, consisting of more or less parallel, cylindrical hyphae 4–16 µm diam. *Subhymenium* a narrow layer of short or subisodiametric elements, 2.5–5 µm diam. *Stipitipellis* composed of parallel, cylindrical hyphae, 3–9.5 µm diam, becoming interwoven at the apex. *Stipe trama* consisting of parallel, cylindrical to subfusoid hyphae, 4–18 µm diam. *Hyphae* of all tissues thin-walled to slightly thick-walled (up to 0.5 µm diam.), with clamp connections, hyaline, to pale yellow in stipe trama, and sometimes with pale brown intrahyphal pigment in pileipellis. (Figs 1 & 2a-c)

Fig. 1. *Nyctalis mirabilis*. Fruiting bodies *in situ* (*T.W. May B-281 & B.A. Fuhrer*). Approx. × 2.

Habit, Phenology and Host

The caespitose basidiomes arise from a common base on old blackened agaric basidiomes and are produced in autumn. The host in all collections is a member of the Russulaceae (*Russula* or *Lactarius*). Knowledge of the Australian representatives of these genera is insufficient to allow identification to species. In four of the five collections examined the host basidiospores are similar enough to suggest that the host is the same species. Basidiospores from these hosts are 7–8(–8.5) × 5.5–7 μm, broadly ellipsoid, Q = 1.14–1.33(–1.38), with an amyloid ornamentation consisting of a more or less complete reticulum joining verrucae up to 1 μm high, and a plage is present (Fig. 2d). The host of *May B-200* has slightly larger basidiospores, 7.5–9 × 6.5–7(–8) μm, Q = 1.11–1.29, with a less complete reticulum.

Further Collections Examined

Tasmania — Mt Wellington, Pillinger Track, off Fern Glade Track, 3 Mar. 1994, *A.V. Ratkowsky*, in *A.K. Mills 1190* (HO, MEL).

Victoria — Eastern Highlands Region: Acheron Way, Acheron Gap, 5 Apr. 1986, *T.W. May B-284 & K.E. Geering* (MEL 228690); Lady Talbot Drive, Whitehouse Creek Scenic Reserve, 30 Mar. 1985, *B.A. Fuhrer & G.A. Crichton* in *T.W. May B-200* (MEL 228693); 19 Mar. 1989, *T.W. May B-585 & B.A. Fuhrer* (MEL 228689).

Habitat, Distribution and Conservation Status

Victorian collections of *N. mirabilis* are all from Cool Temperate Rainforest dominated by *Nothofagus cunninghamii* (Hook.) Oerst. We have also observed the species in Victoria to the east of the Baw Baw National Park, where the Thompson Valley Road crosses South Cascades Creek (under *Nothofagus*), but no specimens were retained. The Tasmanian site is in *Eucalyptus* forest, but *N. cunninghamii* occurs in the vicinity and did occur at the locality prior to wildfires in 1967 (A.K. Mills, pers. comm.).

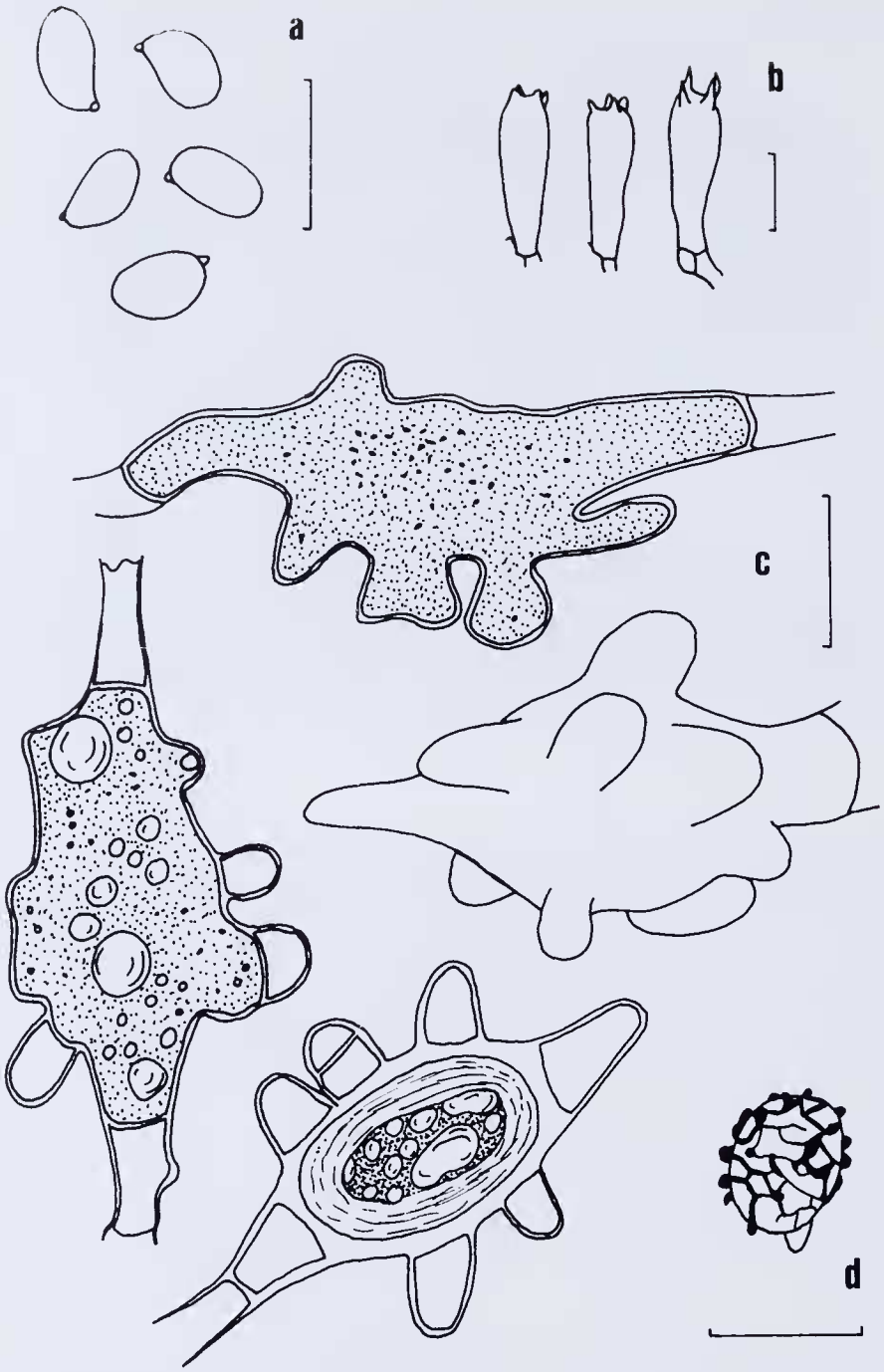

Fig. 2. *Nyctalis mirabilis*. a — basidiospores. b — basidia. c — chlamydospores, one in surface view, three in optical section. d — basidiospore from host. Scale bars = 10 µm. a from *T.W. May B-200*, b & c from *T.W. May B-281 & B.A. Fuhrer*, d from *T.W. May B-585*.

Known localities of *N. mirabilis* in Victoria are within a 70 km range in the Eastern Highlands. The Myrtle Creek site is in a Crown Land Reserve, Acheron Gap is State Forest, and Whitehouse Creek is a State Forest Special Purposes Reserve. In Tasmania the Mt Wellington site is within a Public Park administered by the Hobart City Council.

Despite repeated collecting activity throughout the range of Cool Temperate Rainforest in Victoria and Tasmania, we have rarely seen fruiting bodies of *Nyctalis mirabilis*. A coding system for conservation and distribution information suitable for fungi is yet to be devised, but the species must be regarded on present knowledge as rare and of restricted distribution. Although all sites from which collections have been made are reserved in some way, none are within National Parks and thus the conservation status of the sites should be monitored. In assessing the conservation status of *N. mirabilis* it will be important to establish the host range and the conservation status and distribution of the host or hosts.

Etymology

The Latin epithet *mirabilis* (unusual, surprising) alludes both to the habit and also to the discovery of the species when the other members of the genus have been known for so long.

Discussion

N. mirabilis is in appearance similar to *N. parasitica* and yet has the distinctive stellate chlamydospores of *N. agaricoides*.

The close association of *N. mirabilis* with *Nothofagus* in a restricted area of south-eastern Australia contrasts with the wide distribution of the other two species of *Nyctalis* and presents an interesting biogeographic problem. An explanation for these distribution patterns will need to involve a phylogenetic analysis of *Nyctalis* but the situation does invite comparison with that in the mycorrhizal agaric genera *Descolea* Singer and *Rozites* P.Karst. In these genera there are a number of species present in Australia, New Zealand and other Gondwanan regions, frequently restricted to Cool Temperate Rainforest, with further species occurring in the Northern Hemisphere which are considered to be of more recent origin (Horak, 1983).

Interpretation of the distribution of *Nyctalis* will also need to involve a consideration of the evolution and biogeography of the russulaceous hosts, which are themselves almost exclusively mycorrhizal (Singer, 1986).

ACKNOWLEDGEMENTS

We thank Katrina Geering, Sara Maroske and Jim Ross for advice and encouragement. Neville Walsh assisted with the preparation of the Latin diagnosis. Alan Mills and David Ratkowsky kindly made available material from Tasmania.

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Revised manuscript received 14 November 1994.